

**U.S. Patent Application "Dough portion control machine from flour and similar"**

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The present invention relates to a dough portion control machine from flour and similar, particularly for pizza-restaurants, bakeries etc., comprising a dough feeding hopper, dough extrusion means and dough weight and/or dimension selective control means.

Nowadays pizzas, bread portions and similar are requested for a weight up to 1,5 lb. Consequently a plurality of dough portions machines adapted to the production of a plurality of pizzas, bread and different portions is offered to the market of pizza-restaurants, bakeries and so on.

A known machine is conceived to select dough portions from about 0.1 to maximum 0.7 lb. thanks to a simple device, which provides a dough portions weight selection device by means of an outlet cross section funnel adjustment, which is placed down with respect to a screw feeder. A rotating blade is starting down the screw feeder by means of a sensor, where an operator can preventively select different dough portion weights.

Should dough portions of different weight be required, substantially higher than 0,1-0,7 lb., further more sophisticated, expensive and cumbersome machines are necessary.

An interesting solution could be offered by the same above mentioned machine, which could offer thanks to a simple device the opportunity to prepare dough portions from 0,1-0,7 lb. to 0,7-1,5 lb. The main advantage of such a solution could be given both by reduction of the space, which should be required in presence of a plurality of different machines and by a substantial cost reduction for more than one equipment.

Such a problem is solved by the machine according to the invention, which is characterized in that extrusion means are adapted to co-operate with dough cutting means and with extruded dough portion control means, said extrusion means being adapted to produce together with said cutting means and with control means dough portion which could be even substantially heavier than for instance 0.7 lb., interchangeability means of said extrusion means with further extrusion means being provided on the same machine structure for dough portion production, which could be even lighter than 0.7 lb., for instance within a range 0.1-0.7 lb., with the advantage to prepare dough portion comprised within a range of 0.1-1,5 lb. and even heavier.

Said and further characteristics will be apparent from the following description and the alleged drawings, where:

Fig.1 represents Fig.1 of Italian Patent No.01253370;

Fig.2 represents a perspective view of machine according to the invention;

Figs.3a,3b represent respectively a front view of machine according to the invention in correspondence of a starting phase, as well as an enlargement of a particular device of the same machine taken in a plant view;

Fig.4 represents a front view of the machine according to the invention in correspondence of a second operation phase of the same machine;

Fig.5 represents a perspective view of a partial interior of the machine according to the invention.

## DESCRIPTION

The machine according to the invention comprises a hopper 1 (Figs.2,3,4) for storage and processing of dough, from which single portions are obtained. Said machine comprises also a screw feeder 2 (Fig.5). This latter represents extrusion means, which are described and represented in detail with 21,22,211,221 (Fig.1) also in the Italian Patent No.01253370 issued on August 6, 1995.

Said screw feeder 2 (Fig.5) is adapted to operate thanks to an electric motor, which is settled externally with respect to the machine and which is not represented in the drawings.

A cone-shaped horizontal distributor 3 (Figs.3a,3b,4) is represented in correspondence of the end of a cover 4 of the screw feeder 2, which allows the dough to leave the machine. The single portions of different weight and dimensions are obtained thanks to the pressure exerted by screw feeder 2 into the cover 4, and thanks to further devices, which will be apparent forwards.

Distributor 3 is fixed to a vertical wall 5 (Figs.3a,4,5), for instance by means of two handwheels 6. Said handwheels allow a simple disassembly from the machine of distributor 3, whereby further different distributors 3 can be assembled, as it will be explained forwards.

Distributor 3 is adapted to produce dough portions having a weight comprised within a range of 0.7-1.5 lb. and even more. Distributor 3 represents means adapted to render the machine compatible with performances of a machine, which could produce dough portions substantially lighter than 0.7 lb.

Distributor 3 presents a cone-shaped section outlet and is provided with a longitudinal axis substantially inclined on a vertical plane (Fig.3b) with respect to longitudinal development of the machine due to overall dimensions, as it will be apparent forwards:

The screw feeder 2, which is inside cover 4, and distributor 3 represent extrusion means of the machine according to the invention, whereas handwheels 6 represent interchangeable means of distributor 3 with different distributors, which are adapted to produce different weight and dimension dough portions, for instance also lower with respect to dough portions, which are produced by the machine according to the invention.

A paddle 7 (Fig.3a,4) is fixed by means of a stud 8 inside a notch which is obtained on a cylindrical block 9. Paddle 7 (Fig.3b) is adapted to slide in a way known per se forwards or backwards with respect to longitudinal development of the machine, together with block 9, thanks a handle 10 (Fig.2), so that an operator is allowed to select the amount of dough, which should form a portion weight, as it will be explained forwards.

Handle 10 represents weight and/or dimension dough portions selective control means. In addition paddle 7 is adapted to turn on (in a forward direction) just a bit due to pressure of dough, which leaves distributor 3, whereby it can act on a microswitch (not represented in the drawings), which is

adapted to make an electric motor 11 (Figs.3a,4) start. The motor 11 should transmit by means of a reduction gear 12 a rotation of  $360^\circ$  in the direction of arrow A to a shaft 13. A cam 14 is fixed on said shaft 13.

Rotation of cam 14 is transmitted by shaft 13 to a blade 16 (Fig.3a), which represents dough cutting means of the machine according to the invention. Fig.3a shows rest position of blade 16, which is adapted to rotate clockwise in order to cut a dough worm, which leaves distributor 3. Fig.4 shows blade 16 after cutting dough worm.

A further microswitch arranged on shaft 13 and not represented in the drawings, should stop in a way known per se shaft 13 rotation after just one revolution.

A square 17 is adapted to co-operate with cam 14, which is represented in Fig.3a in a rest device position. Square 17 is adapted to rotate on a block 18, which is fixed to wall 5 of the machine according to the invention and adheres to cam 14 profile by means of a spring 24. As soon as motor 11 starts, a rotation is transmitted to shaft 13, cam 14 makes square 17 rotate in the direction of arrow B and causes in a way known per se rotation of a shaft 26, on which a support 27 is fixed.

Support 27 represents support means of dough worm, which leaves screw feeder 2 until blade 16 is cutting said worm, avoiding in such a way that dough portion falls down. Operator should have previously selected dough dimensions after fixing axial position of block 9 thanks to handle 10 (Fig.2), as it was explained before.

Cam 14, square 17, shaft 26 and support 27 represent extruded dough portion control means of the machine according to the invention.

The machine operates according the following way.

After dough is leaving screw feeder 2, it goes along distributor 3 and encounters paddle 7. This latter assumes an axial position (in a longitudinal direction of the machine) together with block 9, which corresponds to choice of pre-selected dough portion amount. Such a pre-selection is obtained by adjusting handle 10 (Fig.2). This latter is provided with notches, which allow the operator to select a precise dough portion amount.

Paddle 7 is turning on just a bit as soon as dough worm encounters it. Such a rotation make a microswitch activate, whereby motor 11 is starting and makes shaft 13 and cam 14 rotate  $360^\circ$ . Blade 16 is consequently rotating and a pre-selected dough portion is cutted. Such a portion could fall down into a container not represented in the drawings, should support 27 didn't collect it and keep it close to distributor 3. As soon as shaft 13 is rotated  $360^\circ$  a further microswitch stops shaft 13.

The dough worm, which leaves distributor 3, could now fall down or could bend before blade 16 cuts it. As explained, in order to avoid such a drawback, support 27 collects dough and keeps it until blade 16 cuts the pre-select dough amount. All this thanks to square 17 rotation in B direction, which happens as soon as blade 16 has cutted the pre-selected dough portion. After such an operation support 27 rotates clockwise (Figs.3a,4), releases cutted dough portion and makes said portion fall down into a container.

It is to be point out that structure of the machine according to the invention is substantially not so different from the machine claimed in the cited Italian Patent. The main difference between two machines is given both by distributor 3, which is now in the condition to supply dough portions

heavier than 0.7 lb. and all devices, which were explained up to now: shaft 13, cam 14, square 17, support 27 as well as all microswitch not represented in the drawings but functionally explained.

The different dimensions of distributor 3 have to be coupled with its longitudinal axis, which should be now substantially rightwards inclined in Figs.3a,3b,4. Reasons of such an inclination are depending on the fact that, in such a way blade 16, which is provided with the same blade dimensions claimed in the already cited Italian Patent, could cut the entire dough amount, which leaves the screw feeder 2. Otherwise, i.e. if the distributor 3 was conceived provided with the substantially right longitudinal axis, cutting capacity of blade 16 should have been increased, and consequently structure of the new machine with respect of machine claimed in the cited patent should have been different, particularly increased.

Therefore distributor 3 represents as well as its inclined longitudinal axis, means adapted to get the machine according to the invention compatible with a machine adapted to produce dough portions substantially lower than 0.7 lb.

When the machine according to the invention should be adapted to a production of dough portions lighter than a weight comprised within a range of about 0.7-1,5 lb. and more, handwheels 5 should be unscrewed, distributor 3 should be disassembled from machine frame and changed with a different distributor, for instance with distributor, which is described with n.3 in Fig.1 of already cited Italian patent. Such a distributor allows production of dough portions, which are substantially lighter and comprised within a range of about 0.1-0.7 lb.

Therefore the main advantage, which is offered by the machine according to the invention, is represented by the fact that pizza-restaurants are not required to be equipped with more than one machine for production of dough portions comprised within a range of 0.1-1.5 lb. No further investments are necessary besides cost of just one machine.